The invention in which an exclusive right is claimed is defined by the following:

1. An imaging system adapted to determine one or more characteristics of an object entrained in a flow of fluid, from an image of the object while there is relative movement between the object and the imaging system, comprising:

(a) a fluid channel having a generally elongate cross section, such that said fluid channel directs said flow of fluid into a generally broad flat flow;

(b) a collection lens disposed so that light from the object entrained in fluid passes through the collection lens and travels along a collection path;

(c) a plurality of light reflecting elements disposed in the collection path, each light reflecting element reflecting light of a different predefined characteristic along a different reflected light path, and passing light that does not have said different predefined characteristic, such that light from the object passes through each light reflecting element only once;

(d) a plurality of imaging lenses disposed such that for each light reflecting element, at least one imaging lens is positioned to receive one of reflected and transmitted light from the light reflecting element, thereby producing an image, each image projected by each of the plurality of imaging lens being directed toward a different predetermined location; wherein at least one of said plurality of imaging lenses has a focal length differing from another of said plurality of imaging lenses, such that at least one of said plurality of imaging lenses produces a first image having a magnification that is different than a second image produced by another of said plurality of imaging lenses; and

(e) a plurality of detectors disposed such that for each imaging lens, a detector is positioned to receive an image projected by a different imaging lens, each detector producing an output that is indicative of a different characteristic of the object, while the relative movement between the object and the imaging system occurs.

2. The imaging system of Claim 1, wherein each of said plurality of detectors comprises a time delay integration (TDI) detector, each TDI detector producing the output signal by integrating light from at least a portion of the object over time, while the relative movement between the object and the imaging system occurs.

3. A method for determining one or more characteristics of a moving object from a plurality of images of the object, while there is relative movement between the object and the imaging system, based upon light from the object, comprising the steps of:

(a) introducing the object into a fluid channel having a generally elongate cross section, such that the fluid channel directs the flow of fluid into a generally broad flat flow;

(b) while the object is disposed within the generally broad flat flow, focusing the light from the object along a collection path that is in a different direction than the relative movement between the object and the imaging system;

(c) imaging the object using the light that was focused;

(d) at each of a plurality of successive points disposed along the collection path, reflecting light of a predefined characteristic, and passing light that does not have said predefined characteristic, a different predefined characteristic being associated with each of the plurality of points so that light of the different predefined characteristic is reflected from each successive point in a direction different from that at other points;

(e) receiving one of the light that was reflected and the light that was transmitted at each successive point, with a separate one of a plurality of time delay integration (TDI) detectors, each TDI detector producing an output signal in response thereto; and

(f) analyzing the output signal from each TDI detector to determine at least one characteristic of the object.

4. A method for determining one or more characteristics of a moving object from a plurality of images of the object, while there is relative movement between the object and the imaging system, comprising the steps of:

(a) introducing the object into a fluid channel having a generally elongate cross section, such that the fluid channel directs the flow of fluid into a generally broad flat flow;

(b) while the object is disposed within the generally broad flat flow, focusing the light from the object along a collection path that is in a different direction than the relative movement between the object and the imaging system;

(c) at each of a plurality of successive points disposed along the collection path, reflecting light of a predefined characteristic, and passing light that does not have the predefined characteristic, a different predefined characteristic being associated with each of the plurality of successive points so that light of a different one of the predefined characteristics is at least one of reflected from each successive point in a direction different from that at other points and transmitted from each successive point in a direction different from that at other points;

(d) producing an image of the object from light that is one of reflected and transmitted at each successive point, and directing said image toward a different one of a plurality of separate time delay integration (TDI) detectors;

(e) receiving the image produced at each successive point with one of the plurality of TDI detectors, each TDI detector producing an output signal in response thereto; and

(f) analyzing the output signal from each TDI detector to determine at least one characteristic of the object.

5. The method of Claim 4, wherein the vertical elements of each TDI detector are binned to increase the effective read out rate of the TDI detector.

6. A light dispersing component positioned along an optical axis comprising a plurality of light reflecting elements, each light reflecting element reflecting light of a predefined characteristic and passing light that does not have that characteristic, each light reflecting element being positioned at a different angle with respect to the optical axis to direct light of the predefined characteristic in a direction different from that of other light reflecting elements, said different angle ranging from about 44 degrees to about 46 degrees relative to said optical axis, each light reflecting element being positioned adjacent to a preceding light reflecting element such that light reflected by all but a first light reflecting element in the light dispersing component passes through at least one preceding light reflecting element a second time.

7. The dispersing component of Claim 5, wherein wedge-shaped substrates define an angular difference between each light reflecting element, and wherein light reflecting surfaces of the light reflecting elements are sandwiched between the wedge-shaped substrates, forming a monolithic structure.

8. The light dispersing component of Claim 5, wherein the light reflecting elements reflect light based on a spectral characteristic of the light.

9. The light dispersing component of Claim 5, where the light reflecting elements reflect light as a function of a polarization characteristic of the light.

10. A method for determining one or more characteristics of a moving object from a plurality of images of the object, while there is relative movement between the object and the imaging system, based upon light from the object, comprising the steps of:

(a) introducing the object into a fluid channel;

(b) while the object is disposed within the fluid channel, focusing the light from the object along a collection path that is in a different direction than the relative movement between the object and the imaging system;

(c) imaging the object using the light that was focused;

(d) at each of a plurality of successive points disposed along the collection path, reflecting light of a predefined characteristic, and passing light that does not have said predefined characteristic, a different predefined characteristic being associated with each of the plurality of points so that light of the different predefined characteristic is reflected from each successive point in a direction different from that at other points;

(e) receiving one of the light that was reflected and the light that was transmitted at each successive point, with a separate one of a plurality of time delay integration (TDI) detectors, each TDI detector producing an output signal in response thereto;

(f) binning the vertical elements of each TDI detector together to increase an effective read out rate of each TDI detector; and

(g) analyzing the output signal from each TDI detector to determine at least one characteristic of the object.